

WHAT IS CLAIMED IS:

1. A method for synchronizing transmission/reception time for delay in transmission/reception of a data frame of a voice signal in a mobile communication system which includes a media gateway and a base station controller, the media gateway including a trans-coder for converting an analog voice signal and a coded digital voice signal into each other, the base station controller transmitting/receiving a digital voice signal to/from the media gateway, the method comprising the steps of:

10 transmitting information of a forward delay and data frames of a voice signal, which is received from the mobile station, from the base station controller to the media gateway;

15 transmitting information of a reverse delay from the media gateway to the base station controller when the media gateway receives data frames of voice signals from a called party; and

receiving the information of the forward delay and the reverse delay and performing a control for the synchronization in the base station controller and the media gateway, respectively.

20 2. The method as claimed in Claim 1, wherein, the information of the forward delay is set as a difference value which is calculated using an expected arrival time and an actual arrival time of the forward data frames of the voice signal received from the media gateway.

25 3. The method as claimed in Claim 1, wherein, the information of the reverse delay is set as a difference value which is calculated using an expected arrival time and an actual arrival time of the reverse data frames of the voice signal received from the base station controller. ✓✓

30 4. A method for synchronizing transmission/reception time by a base station controller for delay in transmission/reception of a data frame of a voice signal in a mobile communication system which includes a media gateway and

the base station controller, the media gateway including a trans-coder for converting an analog voice signal and a coded digital voice signal into each other, the base station controller transmitting/receiving a digital voice signal to/from the media gateway, the method comprising the steps of:

- 5 checking whether or not forward data frames of the voice signal received from the media gateway are synchronized;
- 10 appointing information of a forward delay when the forward voice data frames are not synchronized, and notifying the media gateway of the appointed forward delay information and a reverse data frame of a voice signal received from a mobile station;
- 15 requesting time synchronization to the media gateway when synchronization is not established for the forward voice data frames received in sequence;
- 20 receiving information of transmission timing adjusted by the media gateway according to the time synchronization request; and
- 25 synchronizing the forward voice data frames using the transmission timing information and transmitting the forward voice data frames to the mobile station.

5. The method as claimed in Claim 4, wherein, the information of the forward delay is set as a difference value which is calculated using an expected arrival time and an actual arrival time of the forward data frames of the voice signal received from the media gateway.
- 25 6. The method as claimed in Claim 4, wherein, in the step of requesting time synchronization to the media gateway, the base station controller appoints information of requesting synchronization of the reverse data frames during a predetermined period of time in a reverse frame message, and transmits the reverse frame message together with a transmission frame of a predetermined frame protocol.

7. The method as claimed in Claim 6, wherein, the reverse frame message

is transmitted through an interface through which the data frames of the voice signal are transmitted, and includes reverse layer-3 data information including information elements of time synchronization and a time delay.

5 8. The method as claimed in Claim 4, wherein, in the step of requesting time synchronization to the media gateway, the base station controller appoints information of requesting synchronization of the reverse data frames during a predetermined period of time in a reverse frame message, and transmits the reverse frame message separately from a transmission frame of a predetermined frame protocol.

10 9. The method as claimed in Claim 8, wherein, the reverse frame message is transmitted through a second interface established separately from a first interface, through which the data frames of the voice signal are transmitted, and includes time synchronization information and information a mobile station identification number.

15 10. A method for synchronizing transmission/reception time by a media gateway for delay in transmission/reception of a data frame of a voice signal in a mobile communication system which includes the media gateway and a base station controller, the media gateway including a trans-coder for converting an analog voice signal and a coded digital voice signal into each other, the base station controller transmitting/receiving a digital voice signal to/from the media gateway, the method comprising the steps of:

20 25 checking whether or not reverse data frames of the voice signal received from the base station controller are synchronized;

 appointing information of a reverse delay, when the reverse voice data frames are not synchronized, and notifying the base station controller of the appointed reverse delay information and a forward data frame of a voice signal;

25 30 receiving a synchronization request from the base station controller when synchronization is not established for the reverse voice data frames received in sequence;

adjusting transmission timing of the reverse voice data frame according to the synchronization request, and transmitting the adjusted information to the base station controller; and

receiving the reverse voice data frame synchronized according to the adjusted transmission timing information from the base station controller.

5 11. The method as claimed in Claim 10, wherein, the information of the reverse delay is set as a difference value which is calculated using an expected arrival time and an actual arrival time of the reverse data frames of the voice signal received from the base station controller.

10 12. The method as claimed in Claim 10, wherein, in the step of receiving a synchronization request from the base station controller, the media gateway receives a reverse frame message together with a transmission frame of a predetermined frame protocol from the base station controller, in which information of requesting synchronization of the reverse data frames during a predetermined period of time has been appointed in the reverse frame message by the base station controller.

15 20 13. The method as claimed in Claim 12, wherein, the reverse frame message is transmitted through an interface through which the data frames of the voice signal are transmitted, and includes reverse layer-3 data information including information elements of time synchronization and a time delay.

25 25 14. The method as claimed in Claim 10, wherein, in the step of receiving a synchronization request from the base station controller, the media gateway receives a reverse frame message separately from a transmission frame of a predetermined frame protocol, in which information of requesting synchronization of the reverse data frames during a predetermined period of time has been appointed in the reverse frame message by the base station controller.

30 30 15. The method as claimed in Claim 14, wherein, the reverse frame

message is transmitted through a second interface established separately from a first interface, through which the data frame of the voice signal are transmitted, and includes time synchronization information and information of a mobile station identification number.

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16. A system for synchronizing transmission/reception time for delay in transmission/reception of a data frame of a voice signal in a mobile communication system which includes a media gateway and a base station controller, the media gateway including a trans-coder for converting an analog voice signal and a coded digital voice signal into each other, the base station controller transmitting/receiving a digital voice signal to/from the media gateway, The system comprising:

10 the base station controller for transmitting information of a forward delay and data frames of a voice signal, which is received from the mobile station, to the media gateway, receiving the information of the forward delay and the reverse delay, and performing a control for the synchronization; and

15 the media gateway for transmitting information of a reverse delay to the base station controller when the media gateway receives data frames of voice signals from a called party, receiving the information of the forward delay and the reverse delay, and performing a control for the synchronization.

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25 17. The system as claimed in Claim 16, wherein, the information of the forward delay is set as a difference value which is calculated using an expected arrival time and an actual arrival time of the forward data frames of the voice signal received from the media gateway.

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30 18. The system as claimed in Claim 16, wherein, the information of the reverse delay is set as a difference value which is calculated using an expected arrival time and an actual arrival time of the reverse data frames of the voice signal received from the base station controller.

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19. The system as claimed in Claim 16, wherein, the base station

controller checks whether or not forward data frames of the voice signal received from the media gateway are synchronized, requests time synchronization to the media gateway when synchronization is not established for the forward voice data frames received in sequence, receives information of transmission timing adjusted by the media gateway according to the time synchronization request, synchronizes the forward voice data frames, and transmitting the forward voice data frames to the mobile station.

5 20. The system as claimed in Claim 19, wherein, when the base station controller requests time synchronization to the media gateway, the base station controller appoints information of requesting synchronization of the reverse data frames during a predetermined period of time in a reverse frame message, and transmits the reverse frame message together with a transmission frame of a predetermined frame protocol.

10 15 21. The system as claimed in Claim 20, wherein, the reverse frame message is transmitted through an interface through which the data frames of the voice signal are transmitted, and includes reverse layer-3 data information including information elements of time synchronization and a time delay.

20 25 22. The system as claimed in Claim 19, wherein, when the base station controller requests time synchronization to the media gateway, the base station controller appoints information of requesting synchronization of the reverse data frames during a predetermined period of time in a reverse frame message, and transmits the reverse frame message separately from a transmission frame of a predetermined frame protocol.

30 23. The system as claimed in Claim 22, wherein, the reverse frame message is transmitted through a second interface established separately from a first interface, through which the data frames of the voice signal are transmitted, and includes time synchronization information and information a mobile station identification number.

24. The system as claimed in Claim 16, wherein, the media gateway checks whether or not reverse data frames of the voice signal received from the base station controller are synchronized, receives a synchronization request from the base station controller when synchronization is not established for the reverse voice data frames received in sequence, adjusts transmission timing of the reverse voice data frame according to the synchronization request, transmits the adjusted information to the base station controller, and receives the reverse voice data frames synchronized according to the adjusted transmission timing information from the base station controller.

25. The system as claimed in Claim 24, when the media gateway receives a synchronization request from the base station controller, the media gateway receives a reverse frame message together with a transmission frame of a predetermined frame protocol from the base station controller, in which information of requesting synchronization of the reverse data frames during a predetermined period of time has been appointed in the reverse frame message by the base station controller.

26. The system as claimed in Claim 25, wherein, the reverse frame message is transmitted through an interface through which the data frames of the voice signal are transmitted, and includes reverse layer-3 data information including information elements of time synchronization and a time delay.

27. The system as claimed in Claim 24, wherein, when the media gateway receives a synchronization request from the base station controller, the media gateway receives a reverse frame message separately from a transmission frame of a predetermined frame protocol, in which information of requesting synchronization of the reverse data frames during a predetermined period of time has been appointed in the reverse frame message by the base station controller.

28. The system as claimed in Claim 27, wherein, the reverse frame

message is transmitted through a second interface established separately from a first interface, through which the data frame of the voice signal are transmitted, and includes time synchronization information and information of a mobile station identification number.